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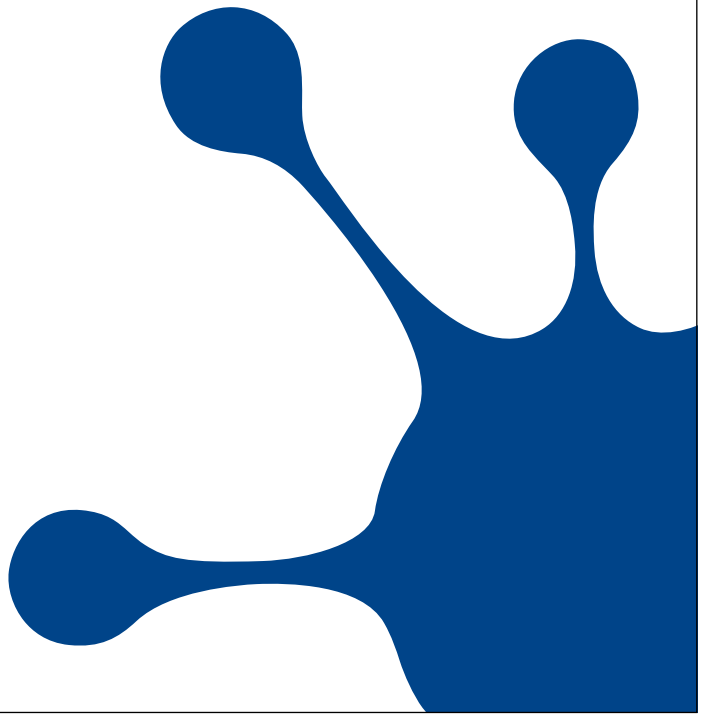
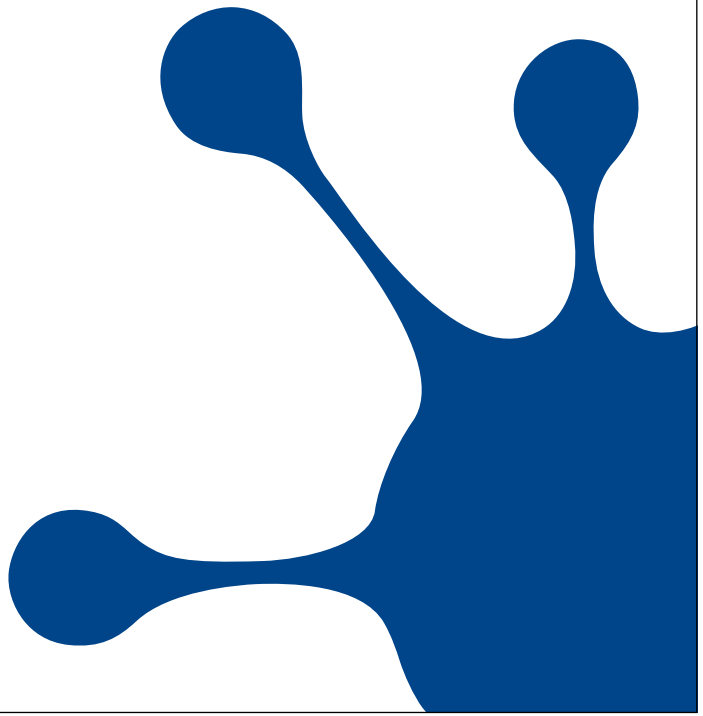
THE HISTORY OF PEERING IN EUROPE AND WHAT THIS CAN TEACH US ABOUT THE FUTURE

SANOG XXI

Cox's Bazaar



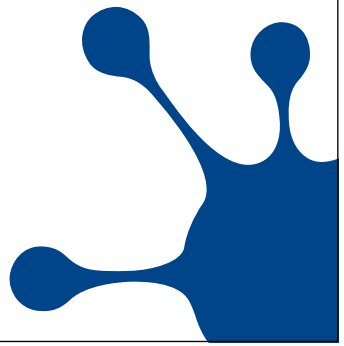
FIRST A VERY QUICK DÉJÀ VU



History of peering in Europe

Basically divided into three phases

1. Early and mostly academic days, 1993-1995
2. Early commercial days, mid to late 1990's
3. Modern times



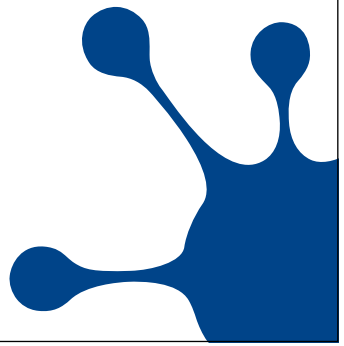
Early and academic days

No competition

People 'wired up' where possible

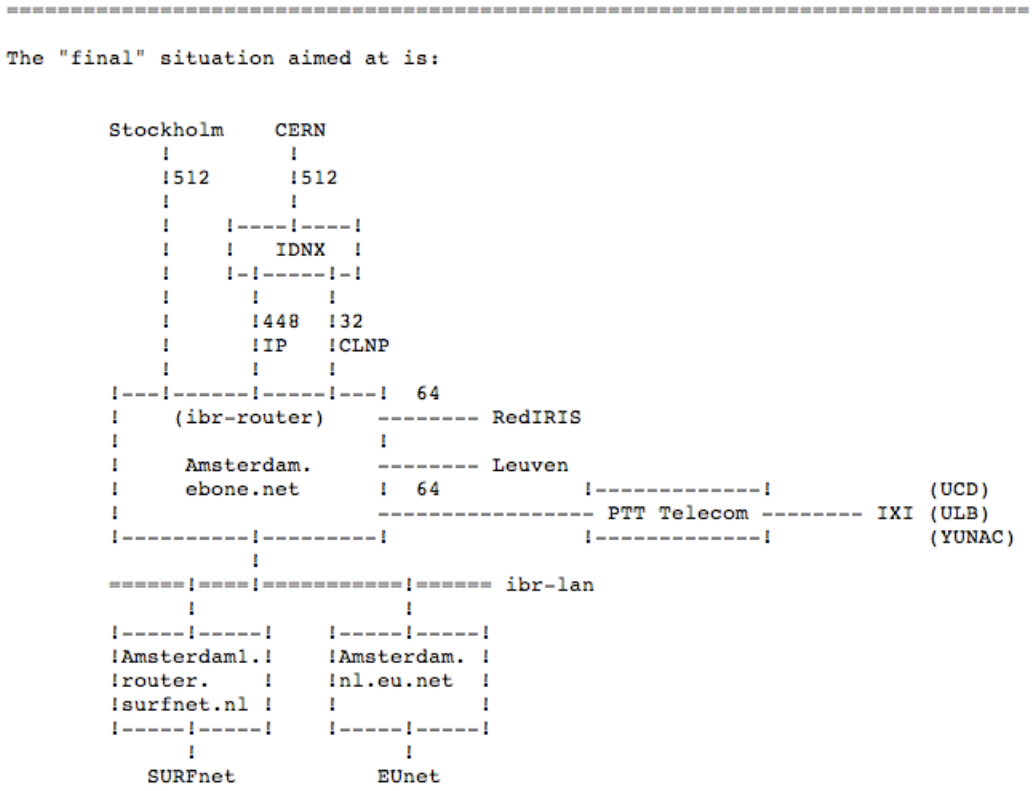
Great co-operation among all parties

Traffic mostly UUCP email and news



Early and academic days

One of the first larger interconnects was the IBR-LAN at CWI in Amsterdam



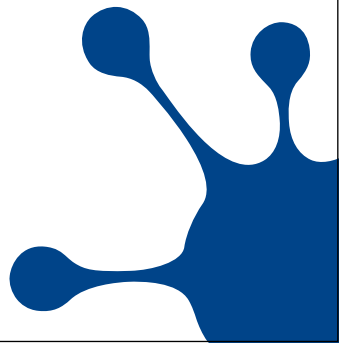
Early commercial days

Educational network funding shifts to universities

Players are starting to form peering policies

The basic rule of "both networks that peer must benefit" is emerging

The first commercial service offerings are starting to use peering as service differentiation



First de-peering threat?

THE WORKS OF D A N T E

A bi-monthly electronic news bulletin reporting on the activities of DANTE, the company that provides international network services for the European research community.

No.8, March 1995

Editor: Josefien Bersee

NEW EBONE-EUROPANET GATEWAY

Since 1 February the fourth consecutive interconnect arrangement between EuropaNET and Ebone has been in operation. As the capacity of the previous gateway was insufficient, the new gateway has a capacity of 1 Mbps, and will shortly be upgraded to 1.5 Mbps. The cost is shared between Ebone and some of DANTE's customers. The current arrangement will cover the first 9 months of 1995.

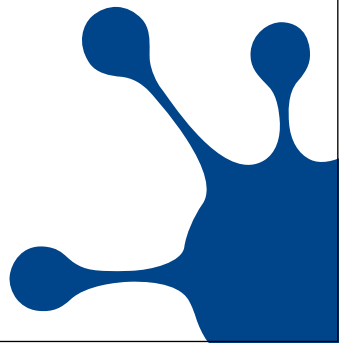
At the same time DANTE regrets not to have been able so far to persuade EUnet to serialize their connection to EuropaNET. DANTE has been providing EUnet with a free 64 kbps access, but in practice much more capacity is used. Therefore DANTE asked EUnet to increase their connection rate accordingly and to serialize the connection in October last year. Unfortunately, DANTE can not indefinitely offer free and unlimited connectivity to some networks while charging others.

History of peering in Europe

Emerged as a way to save on costs

- For transport capacity (that was kept 'artificially' high by ex/PTTs and half-circuit pricing)
- For transit / transatlantic costs

International circuits where low bandwidth so delay was less of an issue in the early days



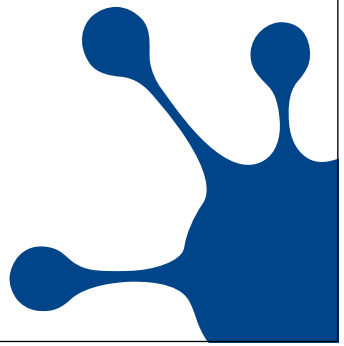
History of peering in Europe

In the early European Internet, most traffic was destined for the US as most content was US based

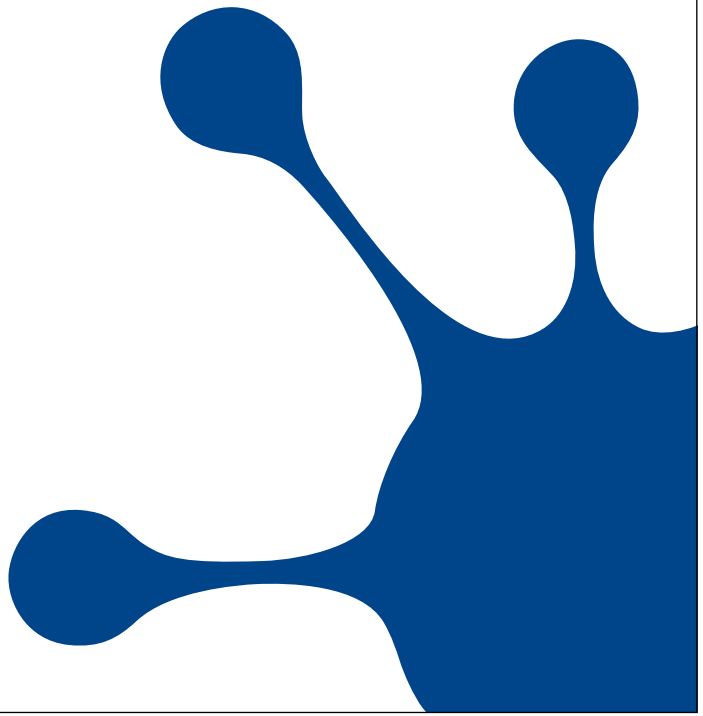
Over (modern) time, more content was developed in Europe

- **Mainly to meet localized interest, culture and language**

Local content changed the traffic flows, and changed the interconnect landscape

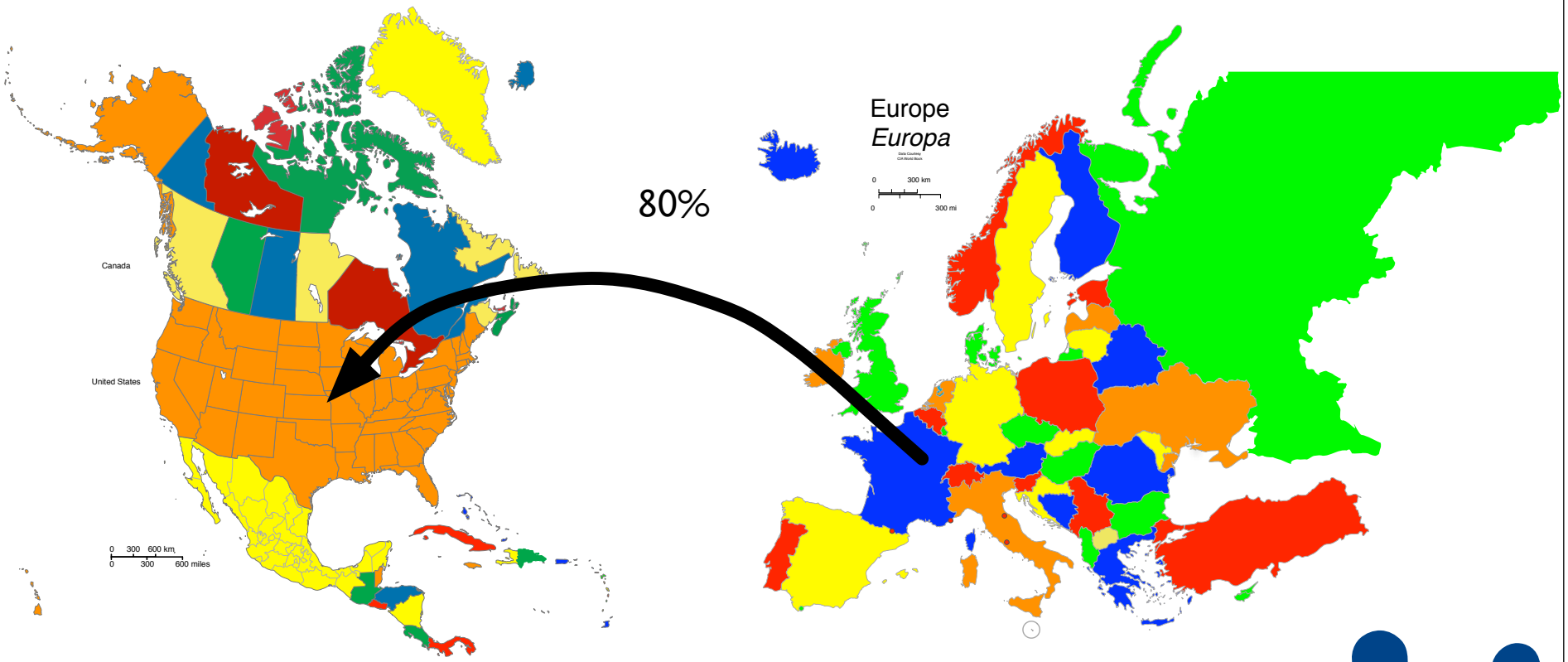


PUT ANOTHER, AND MORE GRAPHICAL WAY

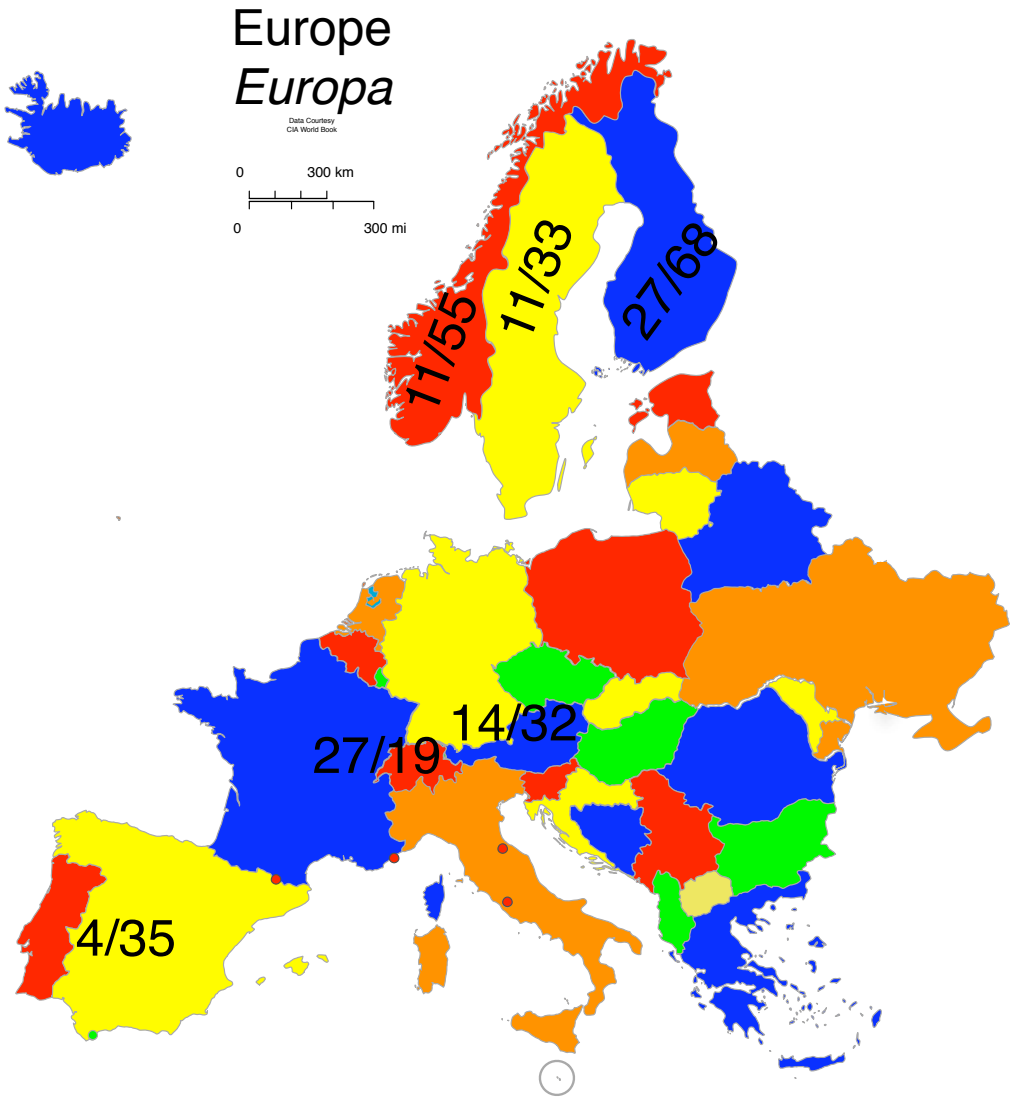


SANOG XXI, Cox's Bazaar, 2013-01-28, Kurt Erik Lindqvist, kurtis@netnod.se

We went from this...



...to this...


Europe
Europa
Data Courtesy
CIA World Book
0
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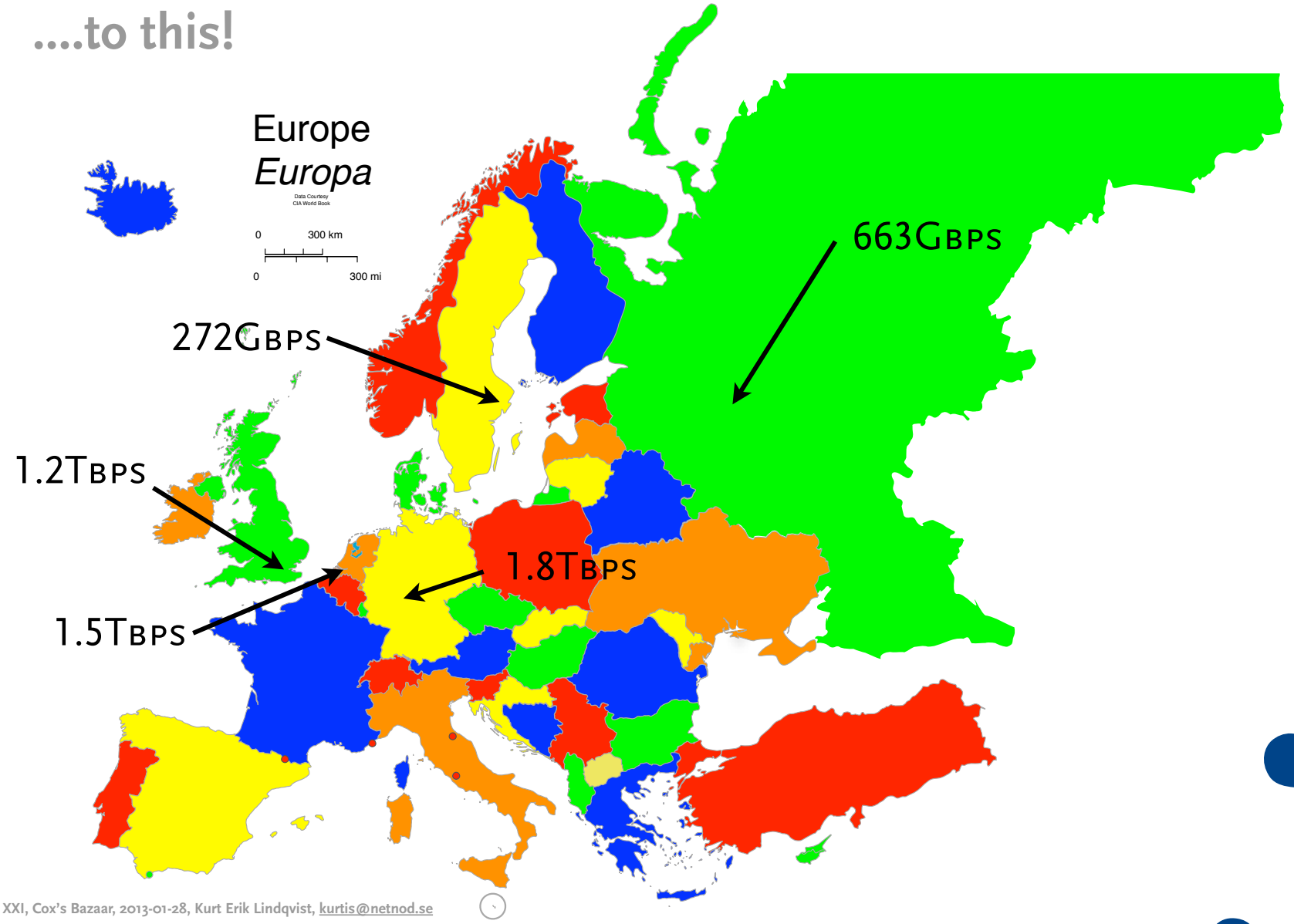
11/55
11/33
27/68
27/19
14/32
4/35

....to this!

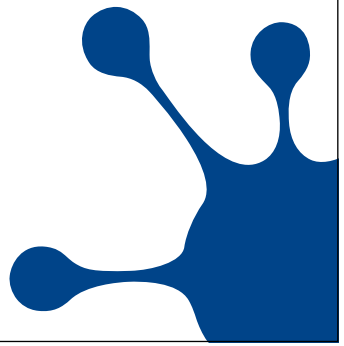

Europe
Europa
Data Courtesy
CIA World Book
0
300 km
0
300 mi
663Gbps
272Gbps
1.2Tbps
1.8Tbps
1.5Tbps

History of peering in Europe

As can be seen on the previous slide traffic shifted to be localized to language regions around 2001

Keeping traffic local helped with "customer experience", and became (at least partly) a goal in itself

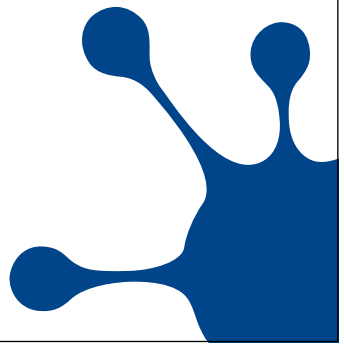
Hot potato routing helped and meant that transport costs were shifted to the peer as quick as possible



History of peering in Europe

While hard to prove, the dense interconnects in Europe helped innovate services and content

At a time when transit prices and transport prices where high, peering provided a way to lower end-user costs and stay competitive against mostly foreign (US based) providers



So what do I gain from peering?

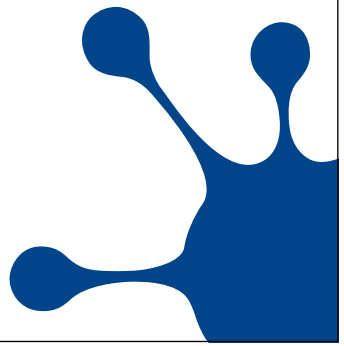
Keeping regional/national traffic regional and local is always good

- **Cheaper, Better performance - will help to develop local content**

Redundancy

- **You are no longer dependent on a single provider as upstream and their current operational status**

Control - allows you greater control of traffic flows

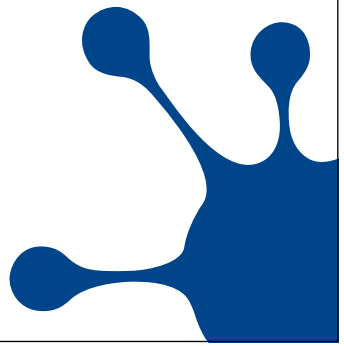


But where do I peer?

Can be done via private or public peering

Public peering and the establishment of Internet Exchange Points (IXPs) followed in the deregulation of Europe (as consequence of more operators - not of deregulation)

Establishing neutral ground where traffic can be exchanged with multiple parties to the price of one connection will benefit the exchange of traffic



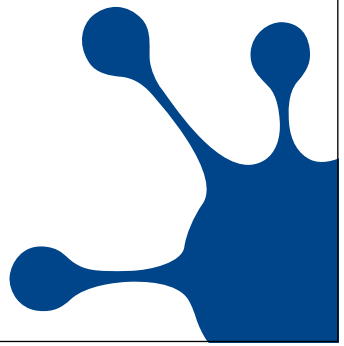
Other benefits with IXPs

Often IXPs or the local operator community have decided to co-locate common services at IXPs

These services are normally of general benefit to the Internet community

- **NTP-service, ccTLD-servers, IRR copies, etc**

Peering with and providing (often free) transit to the IXP infrastructure will help your customers



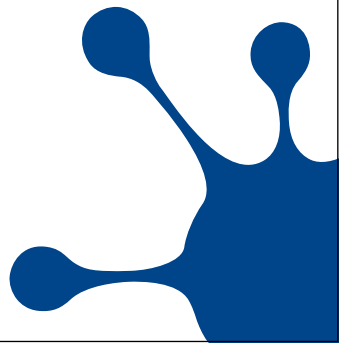
But how much difference does it make?

A small asian provider with a 2xSTM-1 connecting to Linx in London peers away 100Mbps.

- **Started with a satellite uplink and then picked up 11k routes from the route-servers and 40k routes in total**
- **With only little traffic to offer and little effort**

Peering abroad doesn't always make sense, but be sure to make the numbers

But peering nationally almost always makes sense

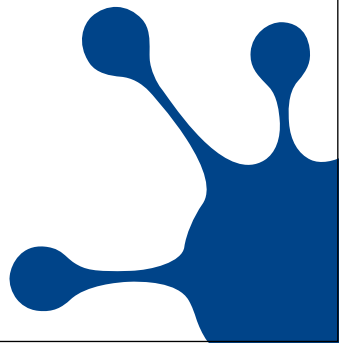


But I am the dominant transit provider!

Are there cases where peering won't be beneficial?

Well, if you are the dominant telco (PTT) you can only loose customer base over time

- The immediate standard action is to try and monopolize the transit connections, but that will only work that far
- The moment there is an alternative transit path (terrestrial or satellite) everyone will loose out

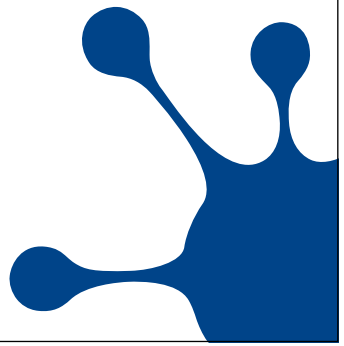


Regulation!

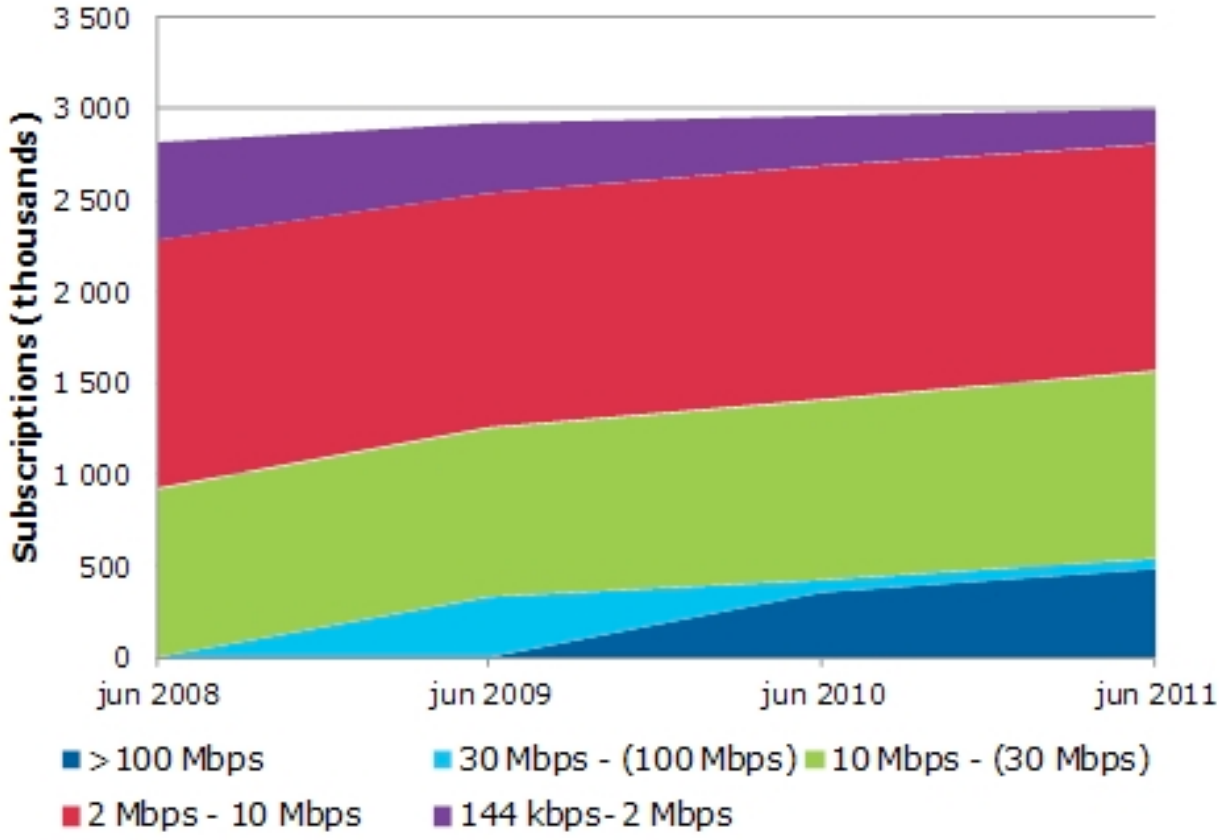
Governments tend to like to regulate (keeps them busy and justify their jobs :-))

But in the case of peering, i.e for-free exchange of traffic - there really isn't anything to regulate

- When it comes to resilience and robustness there isn't really anything to regulate either, as peering is a complement to transit (And from on a national security POV the converse is also true) - and here customer demand will regulate better than any government



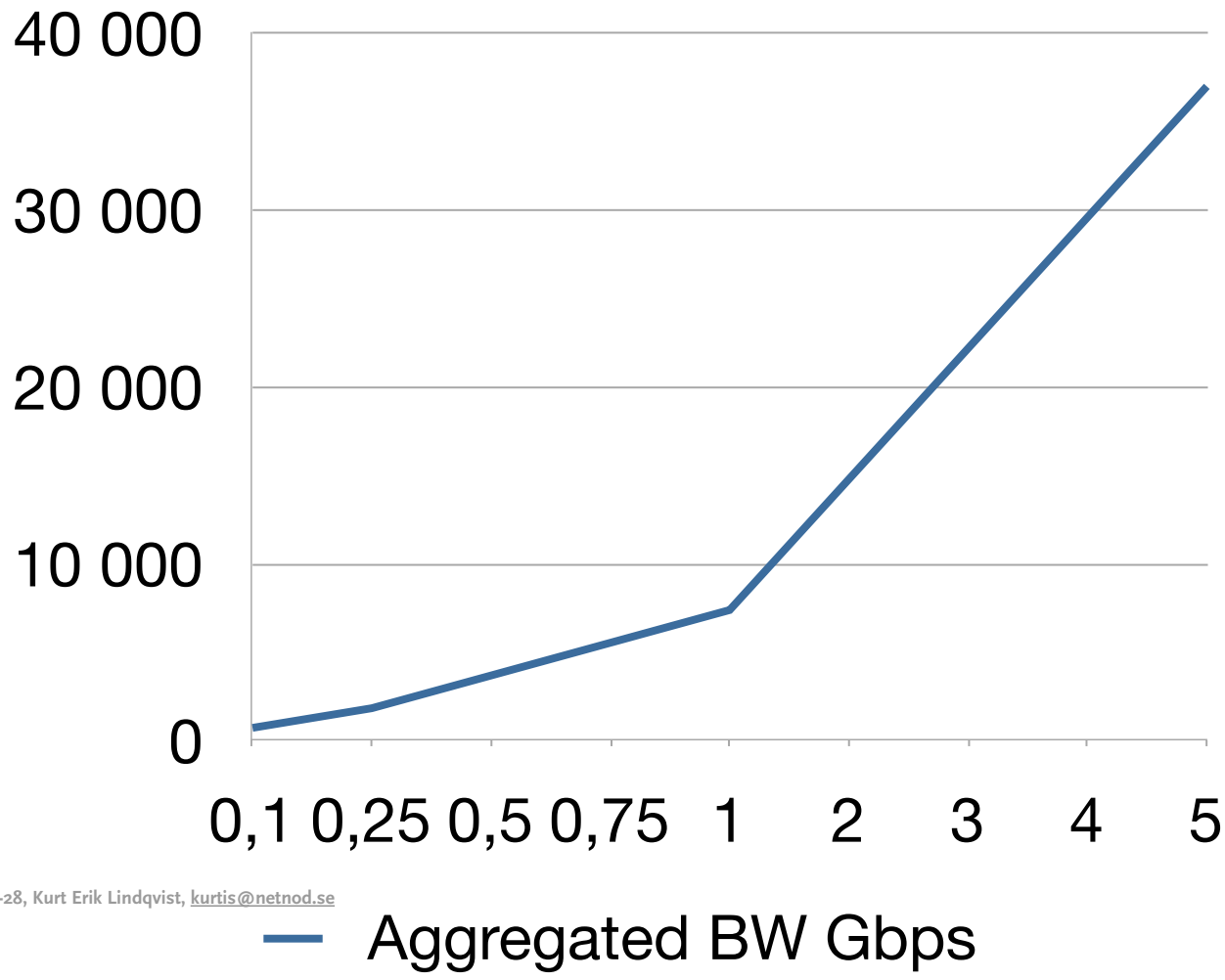
Let's take a random example country



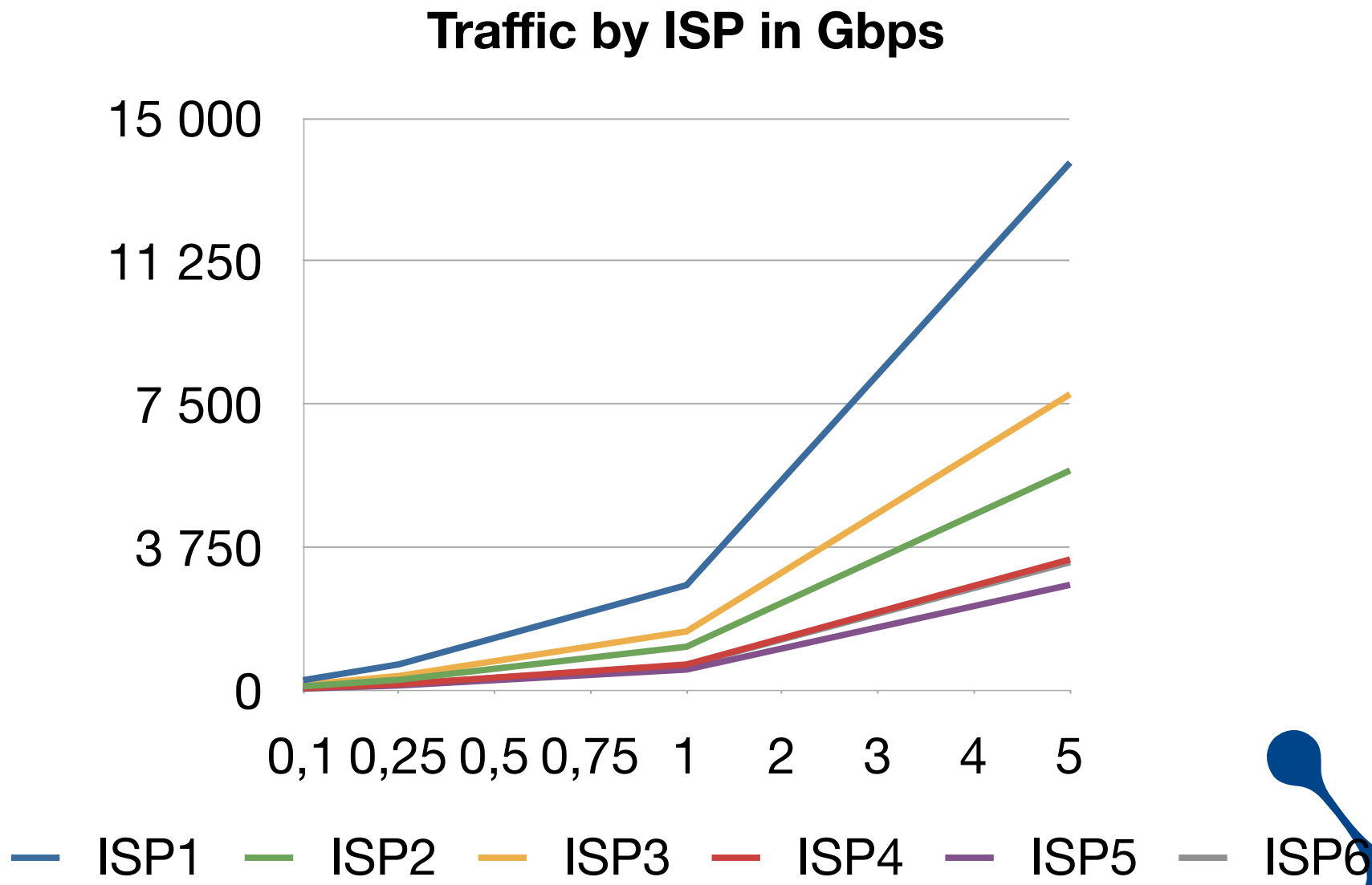
DATA SOURCE: SVENSK TELEMARKNAD 2011

7 400 000 Internet subscribers

“Potential Peak traffic for various avg Mbps”

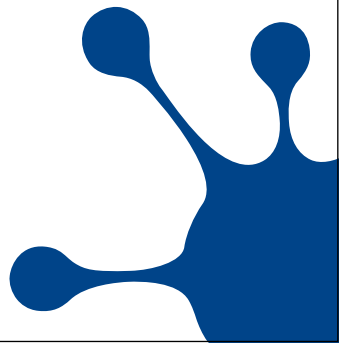


Total data per ISP

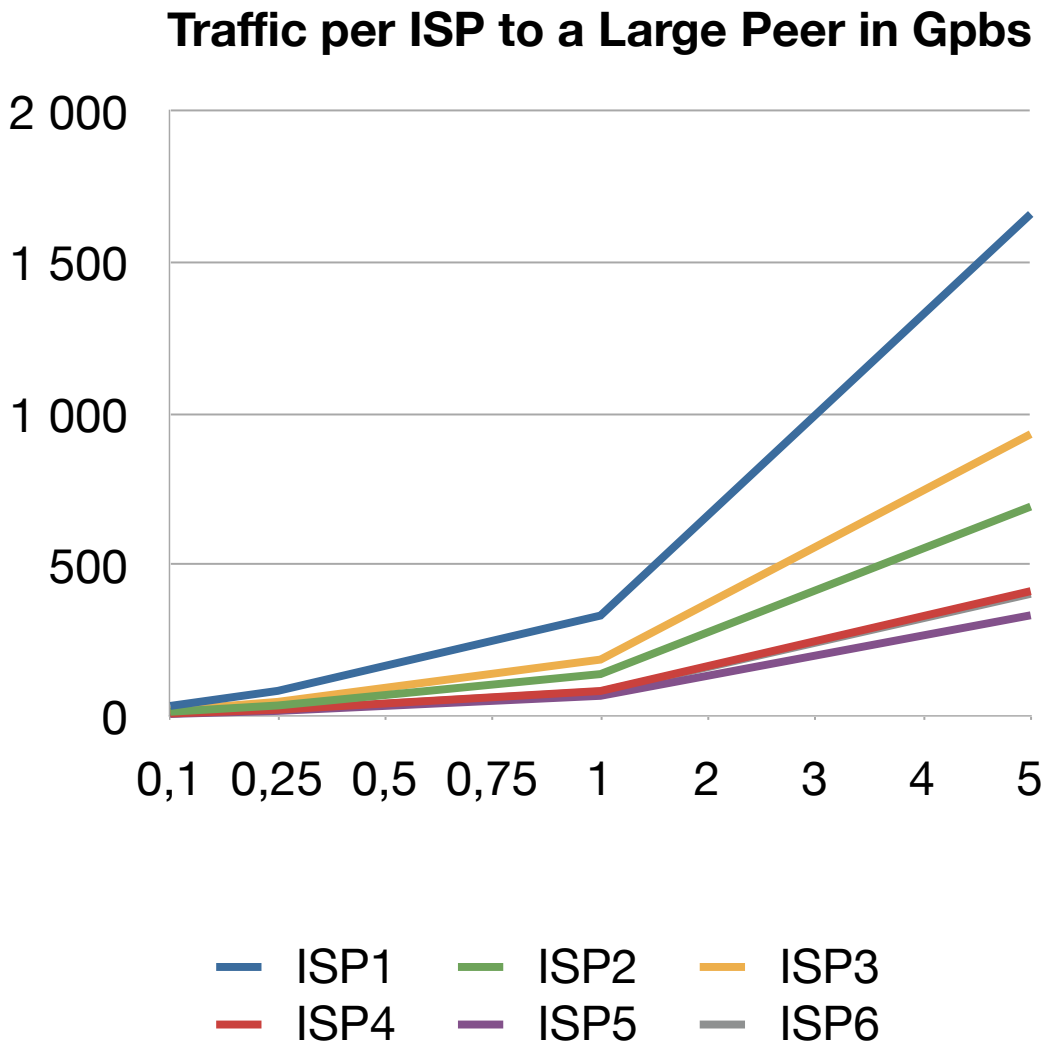


Data source: Marketshare according to Svensk Telemarknad 2011

Warning! Very Hypothetical example to follow!



Data per ISP / Large peer



According to http://ddos.arbornetworks.com/2010/10/google-breaks-traffic-record/

Google then had 8-12% of the Internet traffic. Let's assume 12%, and that that is true in general

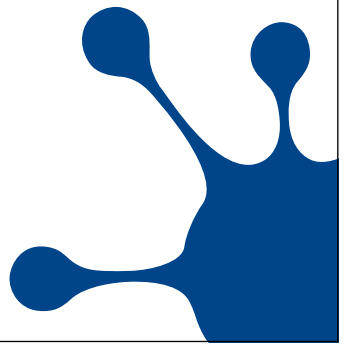
Is this a problem?

No!

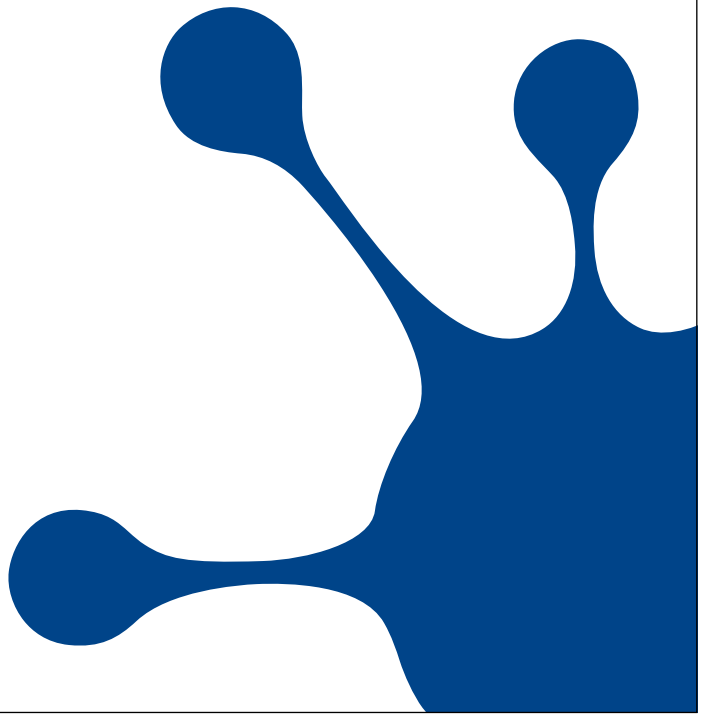
- We got 100G coming
- We peer at so many points
- We have so much transit

Yes!

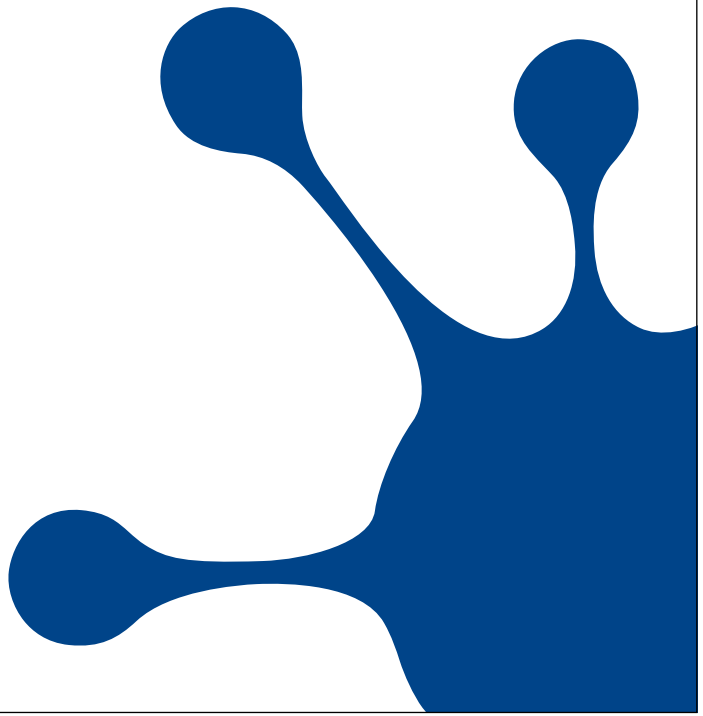
- 100G will be too much shared faith
- We can't back-haul this
- We can't afford to send this over transit...
- Our customers will kill us over the latency



IS THERE ANOTHER SOLUTION?



YES!



Another random example...

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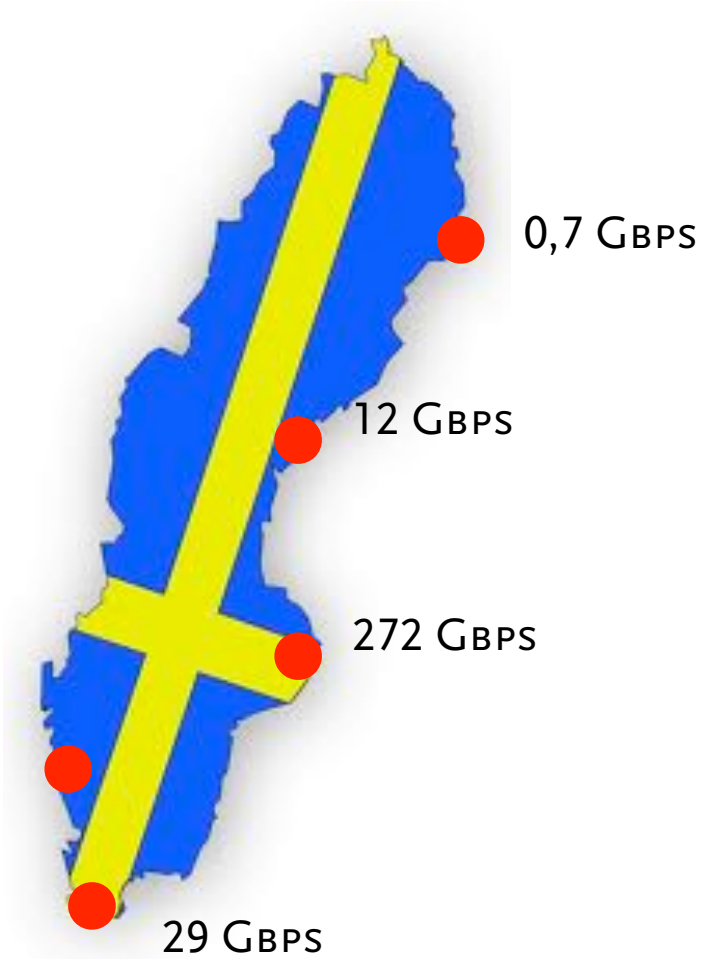
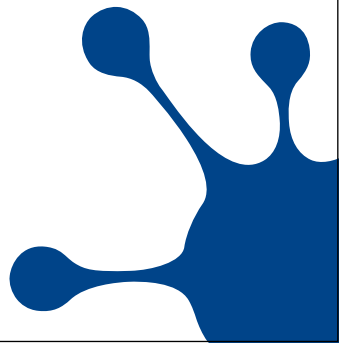


Why the imbalance ?

(More or less) Only eyeballs peering outside Stockholm

Content backhauled to Stockholm



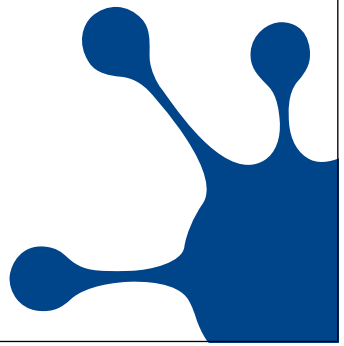
Is history repeating itself?

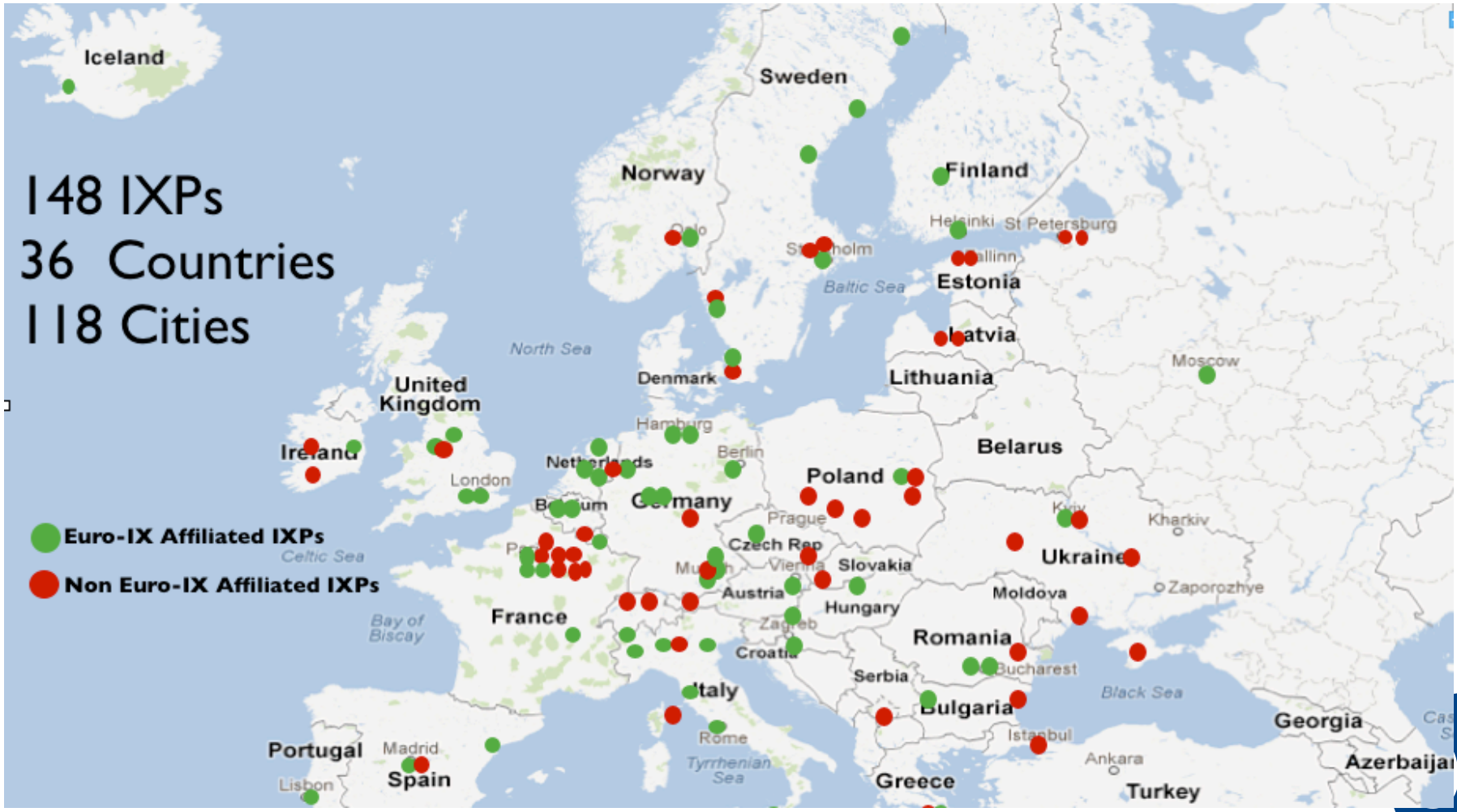
Maybe

CDNs / Content is already doing more and more local / extended peering

They might just be ahead of the curve

Europe already have some of the most extensive peering mesh, but it's still pretty concentrated





DATA SOURCE: EURO-IX

Local peering

Keeping regional/national traffic regional and local is always good

- **Cheaper, Better performance - will help to develop local content**

Redundancy

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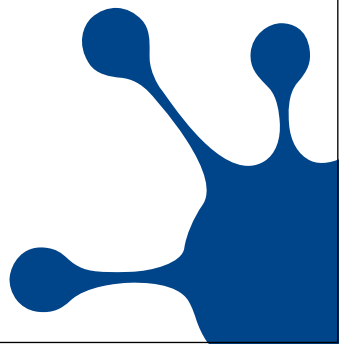
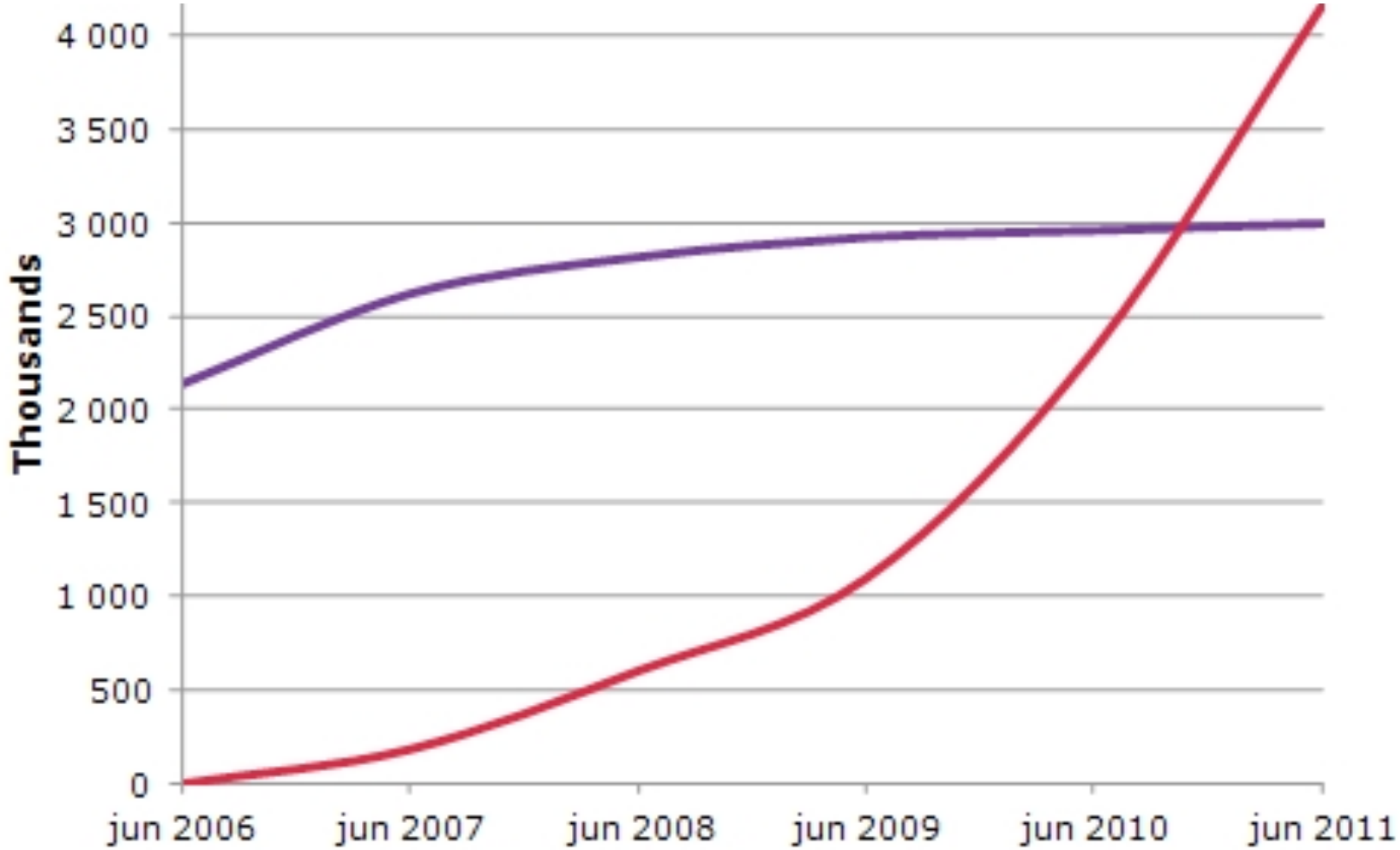
Control - allows you greater control of traffic flows



There might be one saver..



DATA SOURCE: SVENSK TELEMARKNAD 2011

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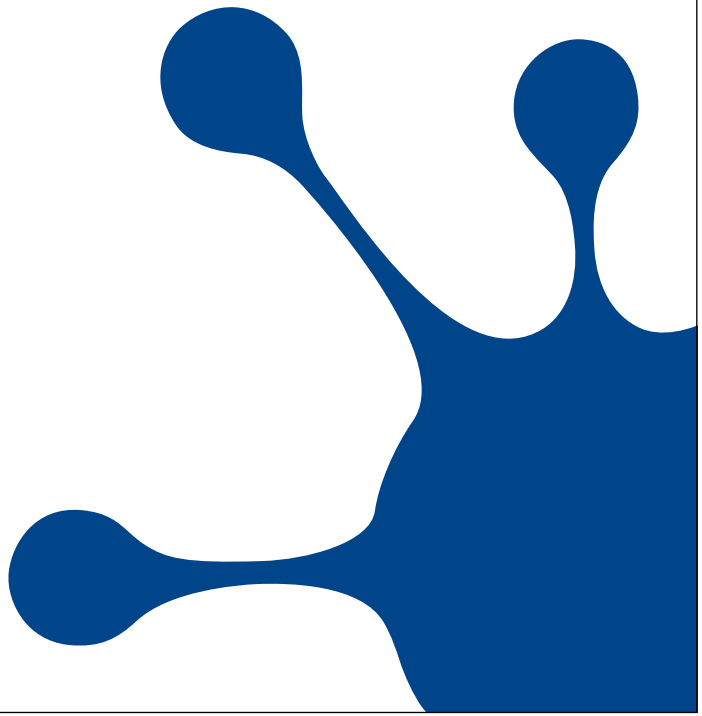
And a lot of thanks to Per Bilse for a lot of the ideas and history!